

TRAUMA "ATLS"

- Trauma is the most common cause of death below the age of 44 years worldwide. (By 2020 >10% will die from trauma) Bailey & Love
- The "ATLS" Advanced Trauma Life Support principles were introduced into practice in the late 1970s, and have since revolutionised the management of trauma

The steps in the ATLS philosophy :-

- Primary survey & resuscitation → identify and treat what is killing the pt.
- Secondary survey : proceed to identify all other injuries.
- Definitive care :- develop a definitive management plan.

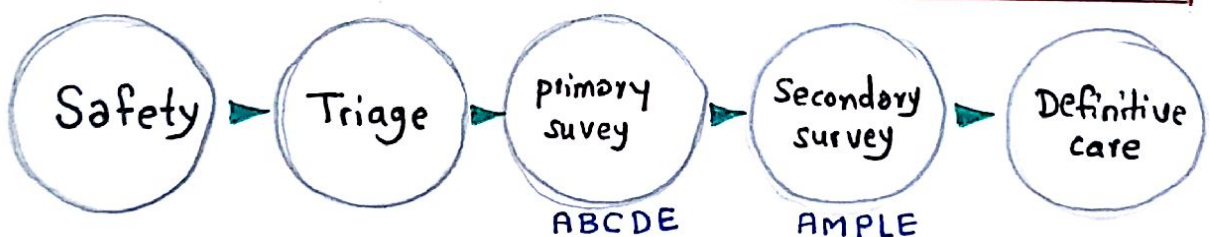
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The 1st and 2nd survey should be continuously repeated.

- The ATLS concise approach to trauma patient care in an effort to improve trauma outcomes acc. to ACS "american college of surgeons"
- Most pt ($\approx 50\%$) die in 1st hours "Golden hours" acc. to the Trimodal distribution of death.

Trimodal distribution of death:-

- immediate death :- $\frac{1}{2}$ (50%) :- within minutes at the scene from lethal injuries.
- early death :- $\frac{1}{3}$ (30%) :- within 4-6 hr "Golden hrs" decreased mortality with trauma care
- late death $\frac{1}{3}$ (20%) :- days - to weeks, death from multiple organ dysfunction, sepsis.. etc



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SAFETY

- The first priority is the safety of trauma team especially in case of war or fights. (secure your self)
- Also shout, call for help, shout and watch the time.

TRIAGE SYSTEM

- Triage involves sorting patients acc. to their injury and availability of resources as follow :-

I ■ **Red** :- who will die anyway $\bar{e}$ or $\bar{e}$ medical attention.
 II ■ **Yellow** :- " " survive only if receive medical " "
 III ■ **Green** :- " " " $\bar{e}$ or $\bar{e}$ medical attention.

- **Mass casualties** :- If No. of pt exceeds the resources (staff and facilities) class II treated first. "treat who need less time, staff & equipment."
- **Multiple casualties** :- If No. doesnot exceed the resources treat all but priority to pt $\bar{e}$ life threatening conditions or multiple injuries.

PRIMARY SURVEY "ABCDE"

- To identify and treat any immediate life-threatening conditions "include a pre-hospital & hospital phase.

adjuncts pulse O_2 $\leftarrow$ **A: Airway** and cervical spine control. $\rightsquigarrow$ air way obst. or injury
 pulse O_2 $\leftarrow$ **B: Breathing**. $\rightsquigarrow$ Pneumothorx (tension/open), flail chest.
 ECG, Foley FAST, DPL $\leftarrow$ **C: Circulation** & hemorrhage control. $\rightsquigarrow$ Shock, ^{ul/LL/pelvis *} temponade, hemothorax
 abd. plus x-ray $\leftarrow$ **D: Disability** (Brief neurological assessment) $\rightsquigarrow$ cervical spine inj. /intracranial
 xray - CT $\leftarrow$ **E: Exposure** & Environment. $\rightsquigarrow$ complete undress & assess. ^{hemoperitoneum}

- Life threatening problems at 1st survey "e.g tension pneumothx) must be treated before proceed to 2nd survey.

A- Airway & cervical spine control:-

- If pt able to speak freely → his airway is patent.
- If pt unconscious or abnormal voice → need airway Management.
 - - Open airway :- by neck extension (C/I if suspect ^{cervical} spine injury) or chin-lift or jaw thrust.
 - - clear airway :- remove vomit, bd or FB by suction or manually (not recommended)
 - - protect "maintain" airway :- by oropharyngeal or nasopharyngeal ^{Basic airway} airway "fallen tongue", NGT (C/I if ^{facial trauma} * base skull) or using advanced (definitive) airway (best ETT)

- Tracheal intubation (ETT) :- indicated in
 - airway injury by neck trauma, inhalation, maxillofacial trauma, hemoptysis
 - airway obst. :- coma (GCS ≤ 8), closed head injury (to ↓ ICP) gurgling or stridor, apnea.
 - Impending obst. :- expanding neck hematoma, burn or chemical to face, surgical emphysema aspiration risk, •
- Nasotracheal intubation :- if cervical spine appears fractured (ETT allows use of a large tube).
- Tracheostomy :- rarely needed in emergency room. (difficult, needs theater, needs time)
- Cricothyroidotomy :- (simple, quick, no theater, easy) but not suitable in children < 10yr → risk of subglottic laryngeal stenosis → so can use needle insufflation instead.
- Drug-assisted intubation replace rapid sequence intubation ATLS 2018

B- Breathing :-

- 1- Assessment :-
 - inspection :- → RR, cyanosis, ^{& jugular vein distension} movement, tracheal shift
 - palpation :- → for subcut. emphysema & flail chest
 - percussion :- → for hyperresonance or dullness (lung)
 - auscultation :- → stridor, wheezing, gurgling, absence of air entry.

- 2 - Management:-
- Tension pneumothorax → needle decompression / chest tube
 - Cardiac tamponade → needle pericardiocentesis
 - Flail chest → intubation & PEEP. (IPPV) ^{strong analgesia}
 - Massive hemothorax → thoracotomy & chest tube
 - Open pneumothx → occlusive dressing / ch. tube.
plaster like a valve
- Aim is to maintain a good ventilation & oxygenation, if pt stable give 100% O₂ by mask to all pt. (high flow)
- 3 - Monitoring 1. clinically assess RR, cyanosis, use of extra CXR
ms of respiration (NB ABG rarely needed and pulse oximetry in shock can not read O₂ saturation due to V.C)

C - Circulation & Hge control :-

- 1 - Assessment:- examine for shock either hemorrhagic (commonest),
cardiogenic (tamponade) or neurogenic (spinal cord inj.)
examine Abd. & pelvis, vital signs, skin (T° & color)
- 2 - Management:-
- Control bleeding by direct pressure if possible.
 - Two large-calibre (16 gauge) peripheral line cannula.
 - Blood for Bd gp, cross match, HCT, CBC "baseline"
 - IV fluid & blood if needed.
- (S/S of hemorrhage known by classes from I to IV)
- [NB] bolus crystalloid "Ringer" with 1 L isotonic is now
recommended to all (> 1.5 L cryst. ass. = ↑ mortality) ^{ATLS 2018}
(early resuss. = blood & bd products in class III, IV)

Adjuncts to the Primary survey :-

- Blood test:- CBC, U/E, clotting screen, glucose, cross match
- ECG, pulse oximetry, ABG
- Two wide-bore cannulae
- Urinary (Foley) and gastric (NGT) catheters
- Radiographs for cervical, chest & pelvis

A	→ pulse O ₂
B	→ " " , CXR
C	→ ECG, Foley, FAST DPL, x-ray abd/pel
D	→ CT, x-ray.

- Best indicator for organ perfusion is → urine catheter
- Best " " tissue " " → PH (lactic acid)

D - Disability :- Neurological.

- Assessment :- (brief neurological assessment)
 - Look for cause → head trauma, drug abuse, hypoxia, shock
 - AVPU evaluation : based on pt response
 - A : Alert & interactive.
 - V : Vocal stimuli elicit a response.
 - P : Painful " " " " "
 - U : unresponsive.
- Followed by Glasgow Coma scale "GCS" in 2nd survey.

warning signs
GCS < 8
deteriorating GCS
unequal pupils
lateralizing sign

NB: Don't Delay transfer when needed
transfer to a higher level care when pt's needs
exceed facilities, don't perform unnecessary
diagnostic test as CT, good communication &
receiving institution.

altered LOC is a hallmark of brain injury.

E - Exposure & Environment :-

- always completely expose & count the No. of wounds
- prevent hypothermia by blankets & ER room warm, ^{warm} fluid
- Insert NGT to decompress stomach & prevent aspiration
- Foley catheter :- to monitor output → CI if ^{urethra blood} perineal hematoma
up displaced prostate
- Radiology :- FAST (Focused Abdominal sonography for trauma)
[4 views → subxiphoid/RUA/LUA/Douglas pouch]



NB :- When you miss any thing from ABCDE do it after E.
always treat life threatening first & major before minor injury.

NB :- Tracheobronchial tree injury :- suspected if chest tube
doesn't improve pt condition → do contralateral bronchus intubation

NB :- Cardiac tamponade :- → Dx by FAST (epigastric view), ttt
best by thoracotomy (definitive) or pericardiocentesis (alternative)

NB :- Massive hemothorax :- → indication for thoracotomy if
> 1.5 L blood total or if > 200 ml/hr for next 4 hr

NB :- Hemodynamic unstable pt when systolic < 90, note
that if systolic < 60 No peripheral pulse.

Do canula → if not central line → intraosseous → vein cut down
all pt take tranxmic in 3hr of trauma & after 8 hrs.

→ SECONDARY SURVEY

- Secondary survey does not begin until completing 1st survey & potentially life-threatening injuries have been dealt with even after theater (e.g. after thoracotomy)
- Aim is to identify all other injuries with "head to toe" examination. The "AMPLE" mnemonic is helpful.

● History:- Allergy.

Medication, including tetanus status.
Past medical history.
Last meal
Events of the incident.

● Examination:- Head ~~exam~~ → injuries, eye (pupil), mouth, Ear & nose.

- Neck & spine → pain or neurological sign (if absent not exclude inj)
→ move pt's body as one piece "log rolling" ^{to inspect back}
- Chest: → pneumothx, hemothx, cardiac tamponade.
- Abdomen: → Peritoneal lavage (DPL = diagnostic perit. lavage)
indicated if - coma & hypotension of unknown origin
- evidence of abd. injury.
- Neurological: → Glasgow coma scale (GCS).
- Limbs: → for fractures & neurovascular bundle.
- DRE (digital rectal exam.) → Bd, prostate, sphincter tone.

NB:- unconscious pt :- Hypoxia → Airway
Hypotension → circulation
Hematoma → disability.

- ## ● Investigation:-
- as primary but we have the time for more necessary invest. as panscan (chest, abd. pelvis CT)
FAST, doppler & duplex, endoscopy to stop bleeding
- glucose level, RFT (renal), ABG.

DEFENITIVE ttt

TERTIARY SURVEY

- During secondary survey, after stabilization of the pt we can detect the definitive injury & deal with the pt according to type of inj. & priorities.
- The pt require **repeated assessment** & evaluation in some injuries (e.g spleen, duodenum & subdural hematoma).
- Continuous monitoring is necessary.
- it is V. imp. to remember that, should the patient's condition change at any time during the initial assessment, then the Primary survey repeated again.
- Don't hesitate to transfer pt if needed from the initial receiving hospital → pt must be hemodynamically and cardiovascular stable.
- An experienced anaesthetist should accompany the pt.
- Damage control surgery :- Life-saving surgery may need to be performed prior to transfer for other injuries.

NB :- ATLS : may be consider control of bleeding as the first step so change to "cABC"

NB :- ACLS : Advanced Cardiac life support in CP arrest may CPR consider compression first → "CABC"

Basic life support = ABC

advanced life supp. = D (drugs, disability, D/C shock ... etc)

prolonged life supp. = treat compl., fluid ... & ICU transfer.